

**Course Syllabus
CHEM 224
Organic Chemistry II
(3 Credit Hours)**

Spring 2009

Office:

Conference Hours:

COURSE DESCRIPTION:

Organic Chemistry is the study of the physical and chemical properties of Organic compounds. Two views will be employed in the course. The macro-scopic view of what is observed in the laboratory and the sub-microscopic view at the molecular level. Organic compounds will be classified into families, and the physical and chemical properties of each family will be discussed as well as the naming of the members of the family. Major chemical reactions associated with each family will be the main focus. Organic reactions will be viewed for their synthetic value, and Mechanistic Theory of Reactions and Structural Theory will be applied. Initially, the class will review basic concepts of molecular structure, chemical bonding, molecular geometry, electronic and atomic structure, and acid-base chemistry. The value of stereochemical isomers will be stressed including conformational, geometrical, and optical isomers.

COURSE CONTENT- CHAPTERS TO BE COVERED

11. Reactions of Alcohols.
12. (modules)
13. (modules)
14. Ethers, Epoxides, and Sulfides.
15. Conjugated Systems, Orbital Symmetry, and Ultraviolet Spectroscopy.
16. Aromatic Compounds.
17. Reactions of Aromatic Compounds.
18. Ketones and Aldehydes.
19. Amines.
20. Carboxylic Acids.
21. Carboxylic Acid Derivatives.
22. Alpha Substitutions and Condensations of Enols and Enolate Ions.
23. Carbohydrates and Nucleic Acids.
24. Amino Acids, Peptides, and Proteins.
25. Lipids.
26. Synthetic Polymers.

TEXTBOOK AND REFERENCE MATERIALS:

“Organic Chemistry”, Sixth Edition By: L. G. Wade, Pearson Prentice Hall.

1. Most important Reference Books:
 - o Langes Handbook
 - o CRC Handbook of Chemistry and Physics
 - o The Merck Index
 - o Organic Syntheses
 - o Reagents for Organic Syntheses by Fieser and Feiser
 - o Various Scientific/Chemical Dictionaries and
 - o Encyclopedias

EXPECTATIONS OF STUDENTS

1. Have access to a textbook. Read and understand the topics.
2. Regular class attendance and participation in class
3. Have a calculator available for quizzes and exams
4. Read textbook and perform assignments
5. Seek assistance when needed. Utilize tutorial services.
6. Take all quizzes and exams
7. Learn chemistry and pass Chemistry 224
8. Refrain from disruptive behavior in class, and **Please do not have CELL Phones ringing in class (use vibrating mode):**

Upon completion of this course, the student should be able to:

- Conceptualize observations made in the lab in abstract molecular terms with the aid of molecular modeling
- Identify the structural formulas and IUPAC names of Organic compounds
- Identify products by name and/or structure for major organic reactions
- Participate in a discussion on how to prepare a desired organic compound
- Appreciate and explain the physical property differences of boiling points and solubility characteristics of organic compounds
- Using Mechanistic Theory, propose a reaction mechanism to explain organic product formation

The course usually covers chapters eleven thru twenty-six. Chapters twelve and thirteen are covered in detail during the laboratory session. However, I will integrate important details of infrared spectroscopy, mass spectrometry and nuclear magnetic resonance as time permits.

1. Focus Area of the Course

Chemistry of Functional Groups and Reactive Intermediates

(Wade, Chapters 10, 11, 14, 15, 19 - 22, and class handouts) Alcohols, Ethers, Epoxides, Sulfides, Amines, and Carboxylic Acids. Enols, Enolates.

NMR, FT-IR, MS, UV-Vis will be covered during the entire semester with modules (assignments must be completed; assignments must be completed with an average passing rate of 50 % to receive a passing grade)

Named reactions will be covered with hand-outs (assignments must be completed; assignments must be completed with an average passing rate of 50 % to receive a passing grade)

2. Some Secrets to Success

Chemistry has the reputation of being a very hard course, requiring a lot of memorization. There is no question that it will challenge your organizational skills, but your instructor is evidence that it is possible to succeed without a photographic memory. Be forewarned, though: it is not possible to succeed in Chemistry without good study habits. The three secrets are: **never get behind, practice, and always think about why** the reactions occur. One more -- **use the resources** that are available to you.

Initially, the course will concentrate on language and structure, and then will emphasize analysis and their reactions. For structural principles, we will use physical models, pencils and computers; the nomenclature is systematic and can be learned with practice. To learn the reagents and products of reactions, some memorization will be necessary, and I will provide hints for learning the reactions. If you concentrate on **why** reactions occur, remembering **what** reactions occur will be easier to understand and learn. There are many facts to be learned in Chemistry, but they all fit very nicely into a theoretical framework that makes the learning much easier. My lectures will focus on the information found in the text; I will emphasize the experiments and reasoning behind the mechanisms more than the text does. Although I may be a little ahead or behind the schedule below, I will discuss the topics in the order listed. "Reading Assignments" mean that you should **read the chapters ahead of time**: you won't understand everything, but you will learn much more in the lecture classes and will be able to formulate questions whose answers can really help you. Topics emphasized in class (relative to the book) will be those, which merit extra time because of difficulty or importance.

In addition to using the text and web resources, you need to study actively, writing summaries and working problems - the more of your senses you involve in the study process, the better you will retain information. I strongly recommend that you make reaction summaries, either on **flash cards** or on sheets of paper, as an aid to learning reactions. Your summary might be graphical or in the form of a list; if you have ever made a concept map, you can use that too. Do not buy commercial flash cards or copy the summaries in the text - the main value in flash cards and other study aids is the thought that goes into preparing them. In fact, the best way to

prepare your review materials is to try to prepare them from memory, and then check against the text and notes, revising as needed.

It is not possible to learn Chemistry without doing problems. **Please** attend any tutorials. From the beginning of the semester, set aside times each week for doing Chemistry problems, combining problems with analysis of the text and notes. Some people rewrite their notes, or make their summaries during their review and problem-solving sessions. You are responsible only for the information in your text and lectures, your laboratory curriculum and the enrichment materials provided.

Comment [MSOffice1]: We can iron-out most of your problems without sacrificing lecture time.

3. Quizzes

The quizzes will be short (5 - 10 minutes), and will be discussed immediately and returned the next class when possible.

4. Grading and Examinations

There will be **four, one-hour examinations during the term plus a cumulative final**. The examination dates will be announced in class. Quizzes **may be** unannounced, or will be announced at least one class meeting in advance. Students on Official University Travel are allowed to make-up examinations. All examinations are scheduled by notice and therefore have mandatory attendance. Those students that have legitimately missed an examination are required to make-up the examination. *Missed examinations must be taken before papers are graded and returned to the class (usually the next class meeting).* The examinations will examine your understanding and recollection of the chemistry included in your text plus any additions or subtractions I make in class; My policy about attendance, etc. is explained in [Section 7, Ethics](#). All of the questions on examinations will require you to write, draw, outline or otherwise tell me what you understand about organic and biological chemistry. The correlation of numerical grades with letter grades is as follows:

EXAMINATIONS AND QUIZZES

90-100% A Superior
75-89.9% B Good
65-74.9% C Satisfactory
50-64.9% D Less than satisfactory (credit except toward major)
0-49.9% F Unsatisfactory (no credit)

The final grade will be based on a weighted average of class participation (attendance, discussion points, professionalism) 10%, modules 15%, quizzes 10%, lecture tests 40%, and final exam 25%. **Each student must pass both lecture and lab to pass the course.** A student with a borderline grade who improves throughout the semester may get a higher grade than a strict average would predict, but not higher than another student with the same average.

5. Laboratory

A separate [lab syllabus](#) with a schedule and guidelines on safety and attendance will be distributed. The laboratory experiments correlate roughly with the lecture, and will introduce you to some of the practical problems in actually carrying out the reactions you meet in lecture. You are expected to be prepared by **studying** the experiment ahead of time and **planning** what you are going to do. Studying is not the same as reading -- you need to visualize doing things so that you will know what containers you need in what order, for example. Poor preparation is dangerous to your health and everyone else's. And don't forget to bring your notebook, goggles and text each time to lab -- you will not be allowed to work without them. .

6. Sources of Help

1. **Text and Study Guide.** Don't look up the answers until you have tried the problems, and never just look up the answers - examine and try to understand the reasoning.
2. **Instructor.** Please see me during office hours; if you stop by without an appointment at other times, I **may** be able to help then, but I may have other duties that prevent me from doing so. You can reach me by e-mail, but I don't always have time to check my e-mail every day.
3. **Other students:**
 - a. You will be surprised how much working together on problems and summaries can help. Be careful not to sit next to your study partners on exams in case you have suspiciously similar answers.
 - b. Students who have completed 223-4
 - c. Upper division Chemistry majors
4. **Old exams**, which may be available from a variety of resources, should only serve as practice problems. Please note that the content of exams varies from year to year with textbook and course pacing, but the concepts remain pretty much the same.

7. Ethics for Students in Chemistry Classes

Most students are never too sick to take an exam and never consider copying anyone else's work. I assume that students are honest and responsible in their work and will assume innocence until my suspicions are aroused. So that you will know what your rights and responsibilities are, I have explained below my policies on attendance and cheating.

1. **ATTENDANCE** in **lecture** is expected; however the student is responsible for learning what is discussed and the time and place of all tests (test dates and content are announced in class). Any student arriving late for lecture (not in your seat at the start of lecture) will forfeit the quiz for that time with a grade of zero.
2. **ATTENDANCE** is **required** for all **laboratory** periods (lecture and activity) and **tests**. Any student arriving late for laboratory lecture may be denied permission to work in the lab for safety reasons; make-ups may not be possible (see lab syllabi).

Students who are ill (or whatever) and cannot take a test or laboratory may be given a makeup opportunity if they i) inform me (before the start of the exam) the day of the test of the reasons for their inability to appear and ii) supply a note from the doctor, mechanic, etc. attesting to these reasons -- before being considered for a makeup. Forgery of such documentation is equivalent to cheating on the exam or lab. Make-ups are a privilege, not a right: they will be given only if scheduling can be arranged, and they will be more difficult than the original. Anyone failing to appear for a makeup exam or lab (except as described in i) and ii) above) will forfeit the privilege for that time and for future times in this course.

a. CHEATING - Any work copied from a book or journal or another student without reference will be considered plagiarized and no credit will be given for the work it is part of. Extensive paraphrasing will receive the same treatment. Please remember this when you are writing lab reports and answering problem sets! Although consultation between students in solving problems is encouraged, identical problem sets will be considered plagiarized and will be given no credit. If others helped you solve the problems, give them credit - credit for assistance is a time-honored tradition in science.

Any cheating on **exams** (copying from each other or from materials brought in, substitute examinees, changing answers after tests have been returned, stealing tests, etc.) or in **laboratory** (results invented, fudged, doctored, copied, etc.) will result in a **grade of F** for the course. Without honesty, there is no science - there can be no compromises at any stage.

A note to all students about what constitutes cheating: In many ways, the activities forbidden and called cheating in school (at all levels) are different from those which are forbidden in the workplace. For example, collaboration on projects is encouraged in the workplace, but usually forbidden in school. In this course, collaboration will sometimes be encouraged in laboratory, so that you can learn and practice the skills you will need in the workplace. This sometimes creates confusion about what is cheating. On the other hand, most cheating in school is also defined as cheating in the workplace -- taking credit for other peoples' work, inventing or altering data, for example. I tried to define what I mean by cheating in the paragraphs above. **If you have any questions** about whether a particular activity is permitted, please ask and I will clarify, usually to the whole class.

Let's assume you do understand what cheating is and are thinking about doing it. Why shouldn't you? Because habits die hard, and if you cheat once, it will become easier the next time, until it becomes a routine. Often students claim that they will stop when the pressure is less, for example, on the job. Sorry folks, but the pressures on employees in the "real world" can be even greater than those on students. Sometimes students excuse their cheating on the grounds that the assignment is "dumb". There are two things wrong with that argument: in the real world people set dumb requirements too and what you think is dumb may have a serious educational purpose.

Let's suppose you see someone else cheating. Should you turn them in? Think about it. Who does cheating hurt? It hurts the students who did not cheat, because they have worked hard and actually learned something and the cheater got the same grade without learning. Even with absolute grading standards the cheater hurts you, because the cheating reduces the value of your grade and degree: employers recognize that the grades do not correspond to the knowledge. And the person who cheated could very well take your job or your slot in professional school on the basis of that grade. The cheater is often caught, but not always - and many continue and escalate their activities, ultimately causing a great deal of harm. That person could go on to cheat on a research project examining the safety and efficacy of a new drug, killing people as a result.

Remember, if you see cheating, you may be the only person who can do anything to stop it, so don't be shy about telling your instructor. I can promise that I will keep any such reports confidential. Remember that your instructor will require more proof than your observations in order to justify punishment of the cheater, so don't expect instant response: students are innocent until proven guilty. I often give a warning if the evidence is weak and keep a close surveillance for more evidence.

Academic Honor System

(a) Academic Honor Code. The Academic Honor System of the University is based on the premise that each student has the responsibility

- (1) to uphold the highest standards of academic integrity in the student's own work,
- (2) to refuse to tolerate violations of academic integrity in the University community, and
- (3) to foster a high sense of integrity and social responsibility on the part of the University community.

(Information below is reproduced from <http://www.cs.usu.edu/~allan/Advising/Etiquette.html>, <http://www.jasminjahal.com/articles/ClassEtiquette.html>)

Miss Manners Do and Don't List

1. Don't get up and walk out during class (unless there is an extreme situation). This disturbs the instructor and other students. If there is an unavoidable circumstance that makes it necessary for you to leave class early, sit near an exit. It is also considerate to inform the instructor at the beginning of class that you will be leaving early. No reasons are needed.
2. Do **not** come to class late; you disrupt others. If your previous class is across campus, speak to me about the situation.
3. Miss class only when absolutely necessary - and then only very rarely.
4. Sleeping or reading the newspaper in class is inappropriate. Your instructor may not notice if you are absent, but it is very likely that he/she knows everyone who sleeps or reads the newspaper in class even once. In Survival (a program to help freshman get acclimated to university life), these two things come up **every year** as being pet peeves of instructors university wide. The behavior is universally seen as a problem.

If you have an unusual situation (such as you work nights) that makes falling asleep in class more likely, you should inform your instructor that you aren't falling asleep to show your disinterest in the class, but you just can't help it. Working on assignments for other classes is also discouraged, but the instructor will give you the benefit of the doubt - maybe you left your assignment home and have no way to get it, maybe you just had a wonderful idea that you will forget if you don't write it down. Don't talk to your neighbors when material is being presented or questions are being asked, whether it is a video or someone addressing the class, student, or instructor. It's not only rude, but it's

distracting to the speaker, as well as to others who want to listen. If you have a question or need a repetition or clarification, ask the instructor.

5. Never interrupt conversations. If you must break in, wait to see if you are recognized **or** say something like, "Please excuse me, but did you realize there are doughnuts in the lounge." You should never assume your time is more important than everyone else's. It is a question of respect.
 6. Pacing in front of the office door or hanging in the doorway (when you haven't been invited in) while your instructor helps someone else is inappropriate. It is okay to stand so the instructor can see you. That is a gentle reminder that someone is waiting. Anything more aggressive is not appropriate.
 7. Listening to another's phone conversation is generally inappropriate. Please stay outside the office until the phone call is completed (unless directed otherwise).
- b. **APPEALS:** Students who believe they have been graded unjustly may appeal through the proper channels.

Final Exam **COMPREHENSIVE!**

***Other Policy ***

1. Late assignments will receive a 10 point deduction/hour late until a grade of fifty percent. No assignments will be accepted more than 5 hours late.

o ***Disclaimer***

Due to unforeseen occurrences such as inclement weather, illness of the instructor, etc material covered in this course may be abbreviated. The instructor reserves the right to alter the content of the course from the description in the syllabus to accommodate the unforeseen events. However, students will receive prior notification of any changes made.

Welcome to the course, and good luck!